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# *Fagopyrum pugense* (Polygonaceae), a New Species from Sichuan, China

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**ABSTRACT.** *Fagopyrum pugense* T. Yu (Polygonaceae, Polygonoideae), known only from LuoJishan, Puge County, Sichuan Province, China, is described and illustrated. It is closely related to *F. gracilipes* (Hemsl.) Dammer ex Diels, but differs in the plants having thicker stems and branches with densely erect-villose pubescence, numerous nodes and short internodes, ovate to cordate leaves that are minutely rugose with small pustules, and small achenes. The karyotype studies were also conducted, and the results are presented.

**Key words:** China, *Fagopyrum*, IUCN Red List, karyology, Polygonaceae.

The Old World genus *Fagopyrum* Mill. (Polygonaceae) is most diverse in China, where 10 of its 16 species are found (Li, 1998; Ohnishi, 1998). In August 2003, while investigating sources of wild-type buckwheat germplasm in the town of LuoJishan, Puge County, Sichuan Province, China, we found a new wild-type buckwheat species that is described here based on gross morphology and karyology.

## MATERIALS AND METHODS

Specimens of a new buckwheat were obtained in July 2006 and cultivated at Sichuan Agricultural University, China. The taxa and collection information are provided in Table 1. Ripe seeds were air dried, and selected seeds were soaked in distilled water in petri dishes for several hours and allowed to germinate at a constant temperature (25°C) for 24 hours until the root tips were 1–2 cm long. Primary roots were pretreated in ice water for 27 hours, fixed for 24 hours in 3:1 glacial acetic acid:ethanol, then washed with distilled water and hydrolyzed in 1 mol/L HCl at laboratory temperature for 8–15 min. Root tips were

squashed and stained in phenol rosaniline. Five well-scattered metaphase plates of each of the six taxa listed in Table 1 were selected for karyotype analysis. An average of karyotypes was calculated using the method described by Li and Chen (1985); karyotype classification was determined using the method of Stebbins (1971).

## TAXONOMIC RESULTS

***Fagopyrum pugense*** T. Yu, sp. nov. TYPE: China. Sichuan: Liangshan, Puge Co., LuoJishan, in thick growth of grass on slopes, 1190 m, 16 Sep. 2006, T. Yu Ghassot 4217 (holotype, SAU). Figure 1.

Haec species *Fagopyro gracilipedi* (Hemsl.) Dammer ex Diels affinis, sed ab eo plantis omnino dense erecto-villosis, caulibus et ramis crassioribus, nodis comparate numerosis, internodiis brevibus, foliis ovatis usque cordatis supra tenuiter rugosis et manifeste minute pustulatis, petiolis longioribus atque acheniis minoribus differt.

Plants annual, 17–70 cm tall; stems mostly erect, sometimes declining or nearly horizontal, usually branched basally, reddish brown, densely villose with long, erect, white hairs, finely grooved; nodes numerous, internodes 1–4.5(–6.8) cm. Leaves alternate, entire; petioles (0.5–)2.6–5.3(–7.5) cm, greenish to reddish brown, densely white villous, finely grooved; leaf sheaths membranous, obliquely tube-shaped, 6–9 cm, with 9 to 15 green veins, villous, long acuminate to caudate apically, sometimes nearly awn-like, simple or bisected; blades papery, white villous with small blister-like projections on both surfaces, green to dark green adaxially, green to grayish green abaxially, (0.9–)1.7–5.5(–6) × (0.7–)1.2–4.6(–5.1) cm, ovate to cordate, cordate or occasionally truncate basally, lateral segments usually not pendulous,

Table 1. Taxa and collection information of specimens for the karyotype analysis.

Taxa	Locality	Habitat	Collection date	Altitude (m)	Voucher
<i>Fagopyrum gracilipes</i> (Hemsl.) Dammer ex Diels	Liangshang, Sichuan	wet sites in valleys	19 Aug. 2006	950–1300	Yu Tang & Ji-Rong Shao s.n. (SAU)
<i>F. cymosum</i> (Trevir.) Meisn.	Ganzi, Sichuan	near riverbanks dominated by shrubs	27 July 2007	600–1000	Ji-Rong Shao & Da- Quan Bai s.n. (SAU)
<i>F. pugense</i> T. Yu	Liangshang, Sichuan	wet sites in valleys	19 Aug. 2006	900–1400	Yu Tang & Ji-Rong Shao s.n. (SAU)
<i>F. gracilipes</i> var. <i>odontopterum</i> (Gross) Samuelss.	Liangshang, Sichuan	moist areas	19 Aug. 2006	850–1200	Yu Tang & Ji-Rong Shao s.n. (SAU)
<i>F. tataricum</i> (L.) Gaertn.	Aba, Sichuan	dry slope	27 July 2007	1000–1650	Ji-Rong Shao & Da- Quan Bai s.n. (SAU)
<i>F. esculentum</i> Moench	Aba, Sichuan	moist areas	27 July 2007	1100–1600	Ji-Rong Shao & Da- Quan Bai s.n. (SAU)

acuminate to nearly pungent apically, margins micro-ciliated; basal veins 7 or 8, lateral veins in (5)6 to 9 pairs, sunken adaxially, projecting abaxially. Inflorescences racemose, axillary and terminal, 2–12 cm; rachis 4-edged, green to brownish, white villous, finely grooved; bracts, when present, foliaceous, ovate to broadly ovate, 0.4–1.4 × 0.5–1.2 cm, finely pubescent, cordate basally, short-acuminate to pungent apically, basal veins 7 to 9, terminated by a cluster of 1–1.2 cm hairs. Flowers usually in lax clusters (0.15–)0.2–1.8 cm apart; bracts funnelform, 2–3 mm, densely hairy with 3 green veins, central vein projecting to an acuminate apex; florets 2 to 4 per bract, the pedicel articulate apically, linear, 1.5–

2.5 mm, often greenish, glabrous; tepals 5, elliptic to narrowly cordate, 1.3–2 × 1.1–1.5(–1.8) mm, greenish or yellowish green; styles 3, 0.5–0.6 mm, glabrous; stigma capitate. Fruit a capsule firmly enclosed by the perianth, black or blackish brown, (1.8–)2–2.5 × (1.5–)1.8–2 mm, trigonous, glabrous, smooth, rounded basally, obtuse apically. Chromosome number:  $2n = 16$ .

*Distribution and habitat.* *Fagopyrum pugense* is known only from wet sites in valleys or on riverbanks dominated by shrubs in and around Liangshan, Sichuan Province, China, at elevations from 900 to 1400 m.

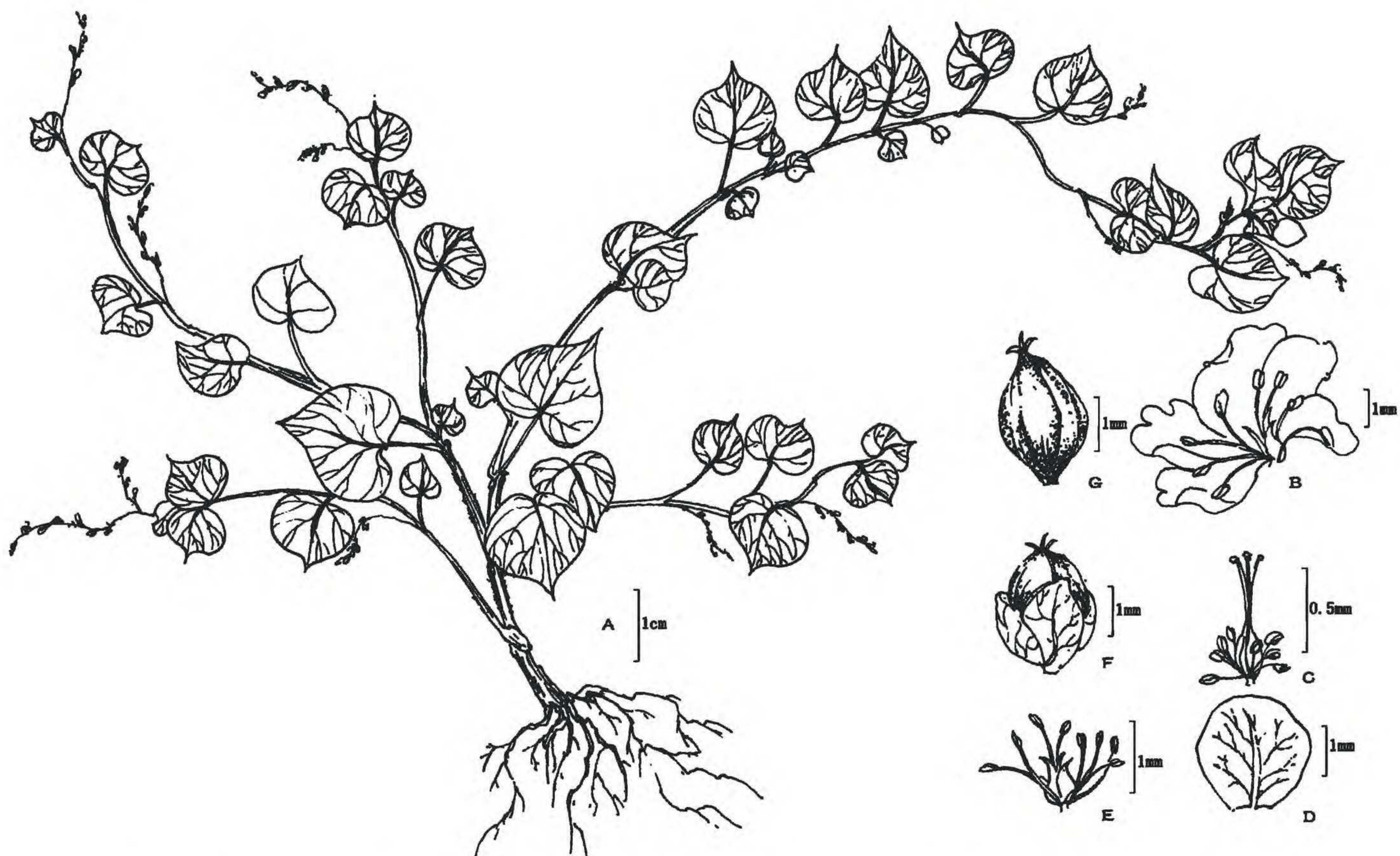


Figure 1. *Fagopyrum pugense* T. Yu. —A. Habit. —B. Flower. —C. Stigma. —D. Tepal. —E. Stamens and stigma. —F. Achene and subtending bractlet. —G. Subtending bractlet. Drawn by Wei Hou from T. Yu 4217 and T. Yu 4315 (SAU).



Figure 2. *Fagopyrum pugense* T. Yu. —A. Root tip cell chromosomes. —B. Idiograms.

*IUCN Red List category.* *Fagopyrum pugense* is assessed here as Least Concern (LC) according to IUCN Red List criteria (IUCN, 2001) because of its relatively extensive distribution and because the areas in which it has been collected are part of a protected habitat.

*Phenology.* *Fagopyrum pugense* has been collected in flower from July to October and in fruit from August to November.

*Etymology.* The specific epithet refers to the type locality, Puge County, Sichuan Province, China.

*Karyotype.* Karyotypes of *Fagopyrum pugense* and *F. gracilipes* were studied and compared. Mitotic metaphase idiograms of the new species are shown in Figure 2. The somatic chromosomes of *F. pugense* indicate that the plant is a diploid with a chromosome number of  $2n = 2x = 16$ ; all 16 chromosomes are metacentric. *Fagopyrum gracilipes* is a tetraploid with a chromosome number of  $4n = 4x = 32$ ; 30 chromosomes are metacentric and two are submetacentric, both of which should be assigned to category 1A (Stebbins, 1971). No satellites were observed on chromosomes of either *F. pugense* or *F. gracilipes*.

The following key is based on an excerpt from the key in *Florae Reipublicae Popularis Sinicae* (Li, 1998).

KEY TO SPECIES OF *FAGOPYRUM* SECT. *FAGOPYRUM*

- 1a. Flowers in lax clusters, interrupted; pedicel articulate apically; plants wild.
  - 2a. Plants with spreading hairs; leaves lacking small blistery projections; achenes usually 5–6 mm long . . . . . *F. gracilipes*
  - 2b. Plant with erect hairs; leaves with small blistery projections; achenes (1.8–)2–2.5 mm long . . . . . *F. pugense*
- 1b. Flowers not in lax clusters, compactly arranged; pedicel not articulate apically; achenes 5–6 mm long; plants cultivated . . . . . *F. esculentum*

*Paratypes.* CHINA. **Sichuan:** Puge Co., LuoJishan town, in a thick growth of grass on slopes, 1260 m, 16 Sep. 2006, T. Yu Ghassot 4315 (SAU).

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